

Lab procedure on 16/10/2019

Pre-Works

- Student should design a velocity feedback circuit and build on the electronic card with strong connections.
- Students should be ready for current and velocity calibration process.
- Software and hardware should be capable of following items;
 - Analog reading for feedback (Current and velocity).
 - Constant PWM output for adjusting voltage on the load.
 - Digital output for adjusting the direction of the load.
 - Serial communication for exchanging data between the computer and the microcontroller (Rx – Tx Pins).
 - Velocity feedback circuit.
- Students should design a motor holder for their electric motors. It must be connected to the encoder system in order to measure the actual velocity of the motor in velocity calibration process. For transmitting the velocity of the motor directly to the encoder shaft, students also should have a connection between the motor shaft and the encoder shaft (Coupling is a good idea. It can be designed and built in 3d printer as well as it can be bought from the suppliers). The dimensions of the encoder system can be found in the website (<https://mee427.github.io/>).

Lab-Works

- The current calibration should be done for at least 4 different current value (one of them should be the offset – zero ampere). One shunt resistor should be used as the load on the system with different voltage levels (PWMs from the microcontroller). You can find the document about the process on the website.
- Velocity calibration should be done for at least 4 different velocity value. In this procedure, the motor should be connected on the motor driver and with different voltage levels, the electric motor should rotate without any load on it. According to real velocity values (it will be measured from the encoder system), the corresponding analog voltage from the feedback circuit should be noted.